DOCUMENT RESUME

ED 171 067 EC 115 276

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TITLE An Interdisciplinary Approach to the Design of Play Environments for Severely Profoundly Retarded Institutional Residents.
PUB DATE Apr 79
NOTE 13p.; Paper presented at the Annual International Convention, The Council for Exceptional Children (57th, Dallas, Texas, April 22-27, 1979, Session F-76)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Building Design; *Custodial Mentally Handicapped; *Institutionalized Persons; Mentally Handicapped; *Play; *Playgrounds; Recreational Facilities; *Trainable Mentally Handicapped

ABSTRACT

The paper reports a project to create a play environment to discourage undesirable behaviors and encourage exploratory play behavior in severely and profoundly retarded institutional residents. It is explained that in addition to information gained from past experience, input from parents, direct-care staff, professionals, maintenance personnel, and administrators was sought in preparation of the final design. Examples of special problems of this population and the solution attempted in the final design are given. Also considered are the educational needs addressed in the design of the play structure. Solutions which involve visual, auditory, and tactile stimulation are outlined. (SBH)

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AN INTERDISCIPLINARY APPROACH TO THE DESIGN OF PLAY ENVIRONMENTS FOR SEVERELY AND PROFOUNDLY RETARDED INSTITUTIONAL RESIDENTS

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This project was supported by a grant from the Pi Kappa Phi National Fraternity.
Parts of this project were conducted in partial fufillment of the requirements for the PhD. in Educational Psychology and Evaluation at The Catholic University of America, Washington, D.C.

EC115276

It is becoming increasingly clear that designers are not only affecting the shape and aesthetic qualities of buildings but are affecting the behavior of those who enter those buildings as well. This effect can be felt every time one enters a cathedral and begins whispering and treading respectfully to adjust to its particular atmosphere. In contrast, the atmosphere created by a very enclosed space such as an elevator often promotes nervous laughter. Architectural features can define places where one may not go, and places where it is O.K. to run and play. In the past, these effects have been considered serendipitous outcomes of designs which were developed based on characteristics of building materials and aesthetic principles. However, recent interest in the behavioral effects of architecture has resulted in the addition of "people" as a design consideration. The METRO stations in Washington, D.C. are an excellent example of a design which sought to control the negative behavior associated with subway stations in other cities by making design and material choices to represent that control. It will be interesting to assess the extent to which these design choices are successful in achieving their goal.

The study of the relationship of behavior and environment, ecological psychology, has begun to shed light on specific behavioral outcomes of particular designs. Using methods borrowed from anthropology and sociology as well as classic experimental approaches, studies have produced three categories of findings which are important to the design of learning environments for any population: (a) childrens' behavior often

changed drastically when they moved from one region to another, (b) the behavior of different children in the same region was often more similar than the behavior of any one of them in different regions, and (c) there was often more congruence between the child's behavior taken as a whole and the milieu of an environment in which it occurred than between specific aspects of his behavior and specific inputs from the region. Beginning with the assumption that there are behaviors which are characteristic of an environment rather than of an individual has important implications for the study of institutionalized persons. Many institutional residents are evaluated, placed in particular programs, and offered opportunities based on observation of their behavior. If this behavior is a product of the environment rather than of the person, many persons may be unfairly categorized and assigned.

Severely and profoundly retarded institutional residents often exhibit a constellation of undesireable behaviors such as self-abuse, self-stimulation, aggression toward persons and things, and/or stereotypic rocking etc... Many programs for these residents focus on the reduction or the elimination of these behaviors as a necessary precondition to placing them in programs for intellectual and social development. However, some of this behavior may be the result of the sterile, logistically convenient environment found in many institutions. If so, it is important to modify that environment to inhibit, rather than encourage that behavior.

A project to create a play environment to discourage undesireable behaviors and encourage exploratory play behavior

was undertaken at the Great Oaks Center for Retarded Persons, Silver Springs, Md. A grant from a private source provided funds to build a multi-media play structure to enhance sensory-motor development in severely and profoundly retarded persons. However, no matter how educationally sound a piece of equipment might be, it is of no use to an institution if it cannot be kept sanitary, if it does not survive, or if it is unsafe. The behavioral problems which placed residents in an intensive habilitation unit within this institution also posed threats to the efficacy of any equipment. Therefore, it was decided to take an interdisciplinary approach to design which would incorporate information from many sources.

Architect/sculptor Thomas Sayre served as designer and supervised the construction of the final piece of equipment. He had previously constructed a play environment for Deaf/Blind residents of the Western Carolina Center in Morganton, North Carolina. Information on the functioning of that piece of equipment was used in the new design. For example, the earlier piece had included some peaked "roofs" over a crawling space which had not been meant to hold residents. The residents liked to climb on these roofs which were seen as dangerous by staff. Therefore, the new piece of equipment included platforms which were safe for crawling on and eliminated extraneous platforms to decrease hazzards. A study conducted by a staff psychologist at Western Carolina Center, Mickey Thigpen, provided much usefull information about preferences for various activities.

In addition to information gained from past experience, input from parents, direct-care staff, professionals, maintenance

personnel, and administrators was sought by the project leader (this author). Several methods of obtaining this input were used;

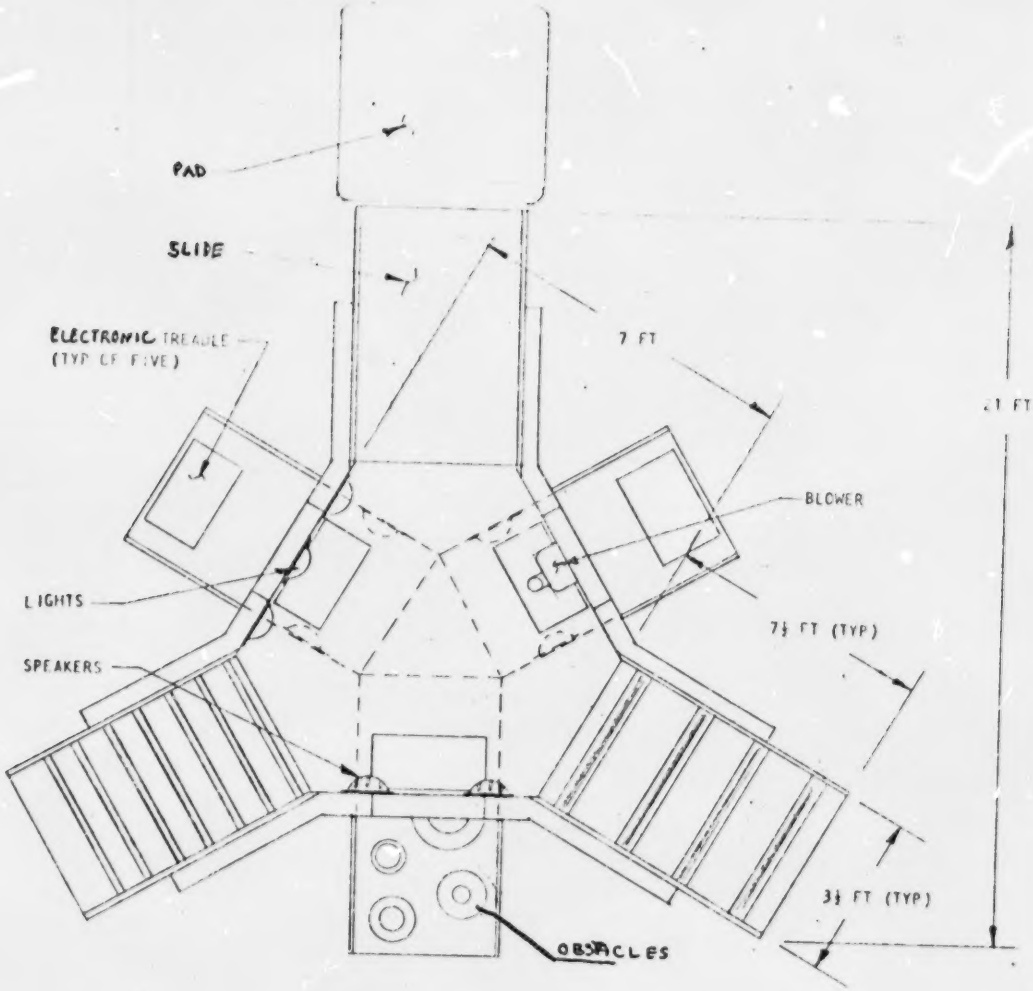
1. Intensive interviews were conducted with parents and staff of the institution to collect information about resident likes and dislikes, special problems, and previous experience with play environments.
2. Meetings of parents and staff groups were held during which groups "brainstormed" ideas for the play environment.
3. Preliminary designs and slides of other equipment were shown for comment, inspiration, and revision.

These methods produced a series of identified problems and some alternative solutions. The final design incorporated solutions which effectively balanced safety needs, charateristics of particular materials, preferences for certain activities, etc.. Decisions about priorities were made with the help of the different input groups. The extent to which the final design is successful in meeting all these different needs is being assessed in an extensive evaluation project currently underway. The following are examples of special problems of this population and the solution attempted in the final design:

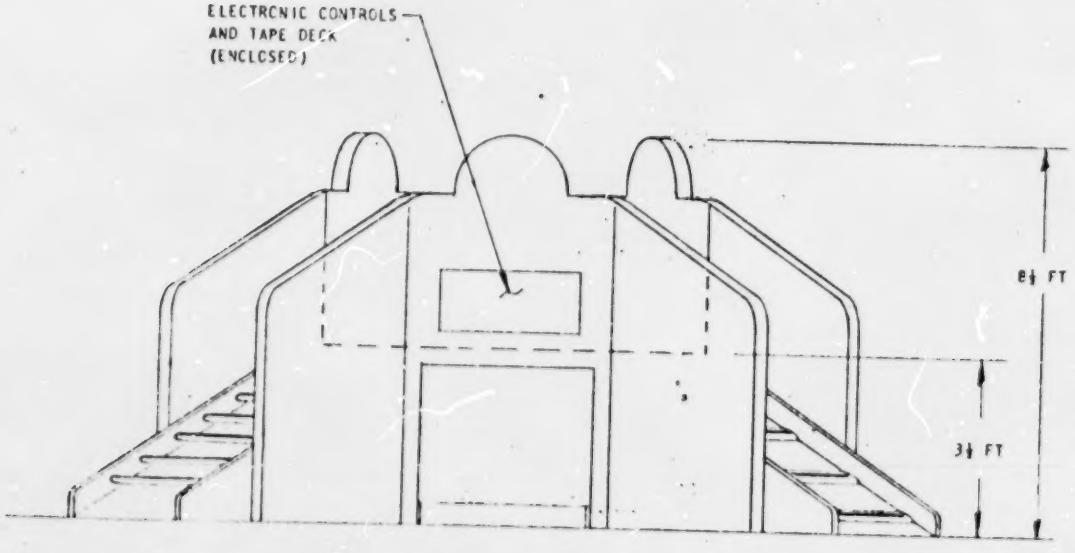
Problem: The majority of residents are not toilet trained. Some residents smear feces, drool, or tend to soil themselves and the environment if possible.

Solution: The structure is entirely covered in materials which can be mopped and will withstand frequent use of heavy-duty industrual cleaners (Formica, Armstrong institutional floor covering, and heavy enamel paint).

All electronics are covered so that the structure can be cleaned with soap and water.



PLAN VIEW



ELEVATION VIEW

Figure 1

No porous materials are used so that the structure will not soak up urine.

The structure rests on a solid base so that nothing can get under the structure through cracks or spaces.

Problem: Some residents suck on or try to eat inappropriate substances.

Solution: All paint used was custom mixed to be entirely non-toxic.

Few small parts were used so that objects could not be swallowed.

The structure contains nothing which can be torn, shredded, or ripped off.

Problem: High degree of seizure activity among residents.

Solution: All areas of the structure are of sufficient size to allow easy access in case of medical emergency.

All parts of the structure can be reached by several alternative routes.

The structure is designed so that all areas can be easily seen from the outside.

Problem: High degree of aggressive behavior resulting in destruction of objects in the environment.

Solution: The structure walls are wood core covered in Formica. These walls are double braced and reinforced with metal and wood trim.

The lights and audio speakers in the structure are covered with 1/2" molded plexiglass held to the wall with 8 extra-long, heavy-duty, screws.

The knobs, handles, buttons, etc...which operate the various stimuli are of the heavy-duty, industrial, type and are held in by heavily fastened steel plate enclosures.

Problem: Tendency on the part of residents to take apart and get into objects in the environment.

Solution: All screws are recessed to make them difficult to reach and are of a type hard to turn with a fingernail or improvised tool.

Edges of walls and ramps are covered with metal strips to make it hard to pry up floor covering.

All parts of the structure are held in by several groups of fasteners so that if a resident does manage to dislodge one fastener, it will be discovered and can be fixed before the entire part can be removed.

The electronics of the structure are run with 5 volt wiring so that if a resident does manage to get off the protective covering he will not receive a serious shock.

These electronics are contained within the inner core of the structure to make them difficult to reach. The control panel can only be reached by opening a double-locked door which is placed quite high on the back wall.

In addition to a long list of special problems, many educational needs were also identified. These were considered to be very important because of the lack of opportunity for exploratory play available in the institution. Although there was an outdoor playground available, it was very difficult to use with these residents. Many of the pieces of equipment required motor skills beyond those of the residents. Some of the equipment seemed dangerous to staff and frightening to residents. Therefore, this playground was not being used very much and residents spent much available playtime in their dayrooms. Some alternative toys and pieces of equipment had been tried. However, because this equipment did not address needs created by special problems, it did not last long and staff was reluctant to bring new things in to the environment. The following educational needs were addressed in the design of the play structure:

Need: The residents need to be active but are often lethargic and do not involve themselves with objects in the environment.

Solution: The structure is very brightly colored. Each entrance is a different color which adds to its attractiveness and and helps to differentiate between experiences.

The structure may be entered by any one of six ramps. It has been observed that many residents will climb if given the opportunity so it was felt that ramps might draw them up and in.

The structures' walls are continuous. It has been observed that many residents will follow a wall with their hand or body. This design entices many into the structure as they approach the ramps.

The end of two of the ramps contains a foot treadle operating a switch which turns on either lights or audio speakers further down the ramp. A resident who accidently turns on the lights or sound by stepping on the treadle may crawl into the structure to see or hear the stimuli.

The pathways are interlocking. Once a resident enters the structure by one stimulus event, he necessarily is exposed to other sensory stimulation.

Need: The residents need sensory stimulation. This should include a variety of stimuli including visual, auditory, and tactile experience.

Solution: Visual Stimulation

A ramp on the lower level contains lights which are turned on by stepping on involuntary foot treadles. These lights shut off automatically after a duration which is variable.

The upper level includes a wall in which an arc of five lights which go on in sequence may be activated by stepping on a foot treadle. The sequence repeats several times and stops automatically. Both the length and speed of the sequence are variable and can be adjusted.

Each of these lights may be turned on individually with a knob, switch, or handle and will stay on only as long as the resident is turning, pushing, etc...

A middle switch may be used to alter the direction of the light sequence.

The color and form of the structure provide additional visual stimulation.

Auditory Stimulation

A ramp on the lower level contains two speakers which are activated by an involuntary foot treadle. Sound is provided by an 8-track tape player hidden in the control panel. Tapes of any kind may be used including music, human voice, sound effects, etc...Once activated the tape runs for a variable length of time and shuts

off automatically.

On the upper level there is a wall in which four speakers may be activated by an involuntary foot treadle. These are connected to a second 8-track tape player in the control panel. These speakers shut off automatically and the volume and duration are variable.

Each of the upper level speakers may also be activated with a knob, handle, or switch placed right next to the speaker. These activate the speaker only as long as the resident is pulling, pushing, etc...

Two toggle switches in the wall activate the lower/upper and left/right speakers.

Tactile Stimulation

A simple obstacle course ramp leads into the lower level of the structure. This consists of a series of wooden "bumps" which can be negotiated in a variety of ways.

To encourage residents to either crawl on or around the obstacles, different materials such as sandpaper and carpet can be placed over the ramp such that the alternative to stepping on the obstacles is either pleasant or unpleasant to touch. These are removeable to provide variety and so that they can be cleaned or discarded as necessary.

The upper level contains a lavatory hand dryer on one wall which blows warm air for a variable length of time. This can be activated either by an involuntary foot treadle switch below it or by its own knob. The air nozzle can be manipulated to blow air in any direction.

Need: The residents need organized motor activity. There is a great range of ability and experience in motor development among residents.

Solution: The play structure contains a ground level which provides opportunity for lower functioning residents to make simple movements and an upper level requires the use of more advanced motor skills.

Ground Level

Two ramps are available for crawling. Many residents do not crawl and it is felt that this type of activity requiring alternation of body movements is important.

These ramps are extreemly gradual and are also comfortable for sitting, crouching, rolling, etc... The ceiling at this level is about 2 1/2 feet high.

One ground level ramp provides a simple obstacle course. This ramp may place a resident in the situation of having arms and legs at different levels and balance must be maintained. Residents must also maneuver around, between, or over obstacles.

The three ground level ramps cross at the center of the structure forming a small common platform on which residents may turn around, cross to one of the other ramps, or interact with other residents coming the other way.

Upper Level

A fairly steep ramp with a physical therapists' ladder lying in it leads to the upper level. This provides the opportunity for climbing in various ways. The rungs of the ladder also encourage the residents to use a grasping motion with their hands.

A second steep ramp leading to the upper level consists of floor covering crossed by several metal strips which provide a grip while crawling up and a brake while sliding down.

The third ramp on the upper level consists of a fast slide enclosed by walls.

The three upper ramps meet to form a platform which is surrounded by the walls containing various sensory stimuli.

Once they have found their way up, residents must find a way down which provides a different type of motor activity.

All ramps are enclosed by high walls to minimize the danger of falling. The structure is built so that the upper level walls almost reach the ceiling to discourage residents from jumping over instead of using the ramps.

Need: The residents need the opportunity to observe and experience cause and effect. The institutional environment provides a minimum of opportunities for residents to act upon their environment in a positive way.

Solution: All sensory stimuli may be activated by an involuntary switch triggered by a foot treadle near the stimuli. Residents may eventually understand the connection between their movement on the foot treadle and the resulting stimuli.

The stimuli shut off automatically to motivate residents to make it happen again.

Stimuli on the upper level may be activated by a series of knobs and handles chosen because of their familiarity to residents. Stimuli is activated only as long as the resident keeps his hand on the knob. It is hoped that this will increase the understanding of the connection between the action and the result.

Several switches are placed slightly away from the stimuli and illustrate a more abstract case of cause and effect such as directionality and selectivity.

The stimuli on the upper level is placed on walls which face each other. Therefore, when a resident is interacting with one set, he has his back on the others. It is hoped that this will help focus his attention on the stimuli he has activated and interest him in exploring available alternatives.

It remains to be seen whether this play environment will encourage more exploration and appropriate play than other play environments traditionally found in institutions. However, the varied contributions of parents, direct-care and professional staff, maintenance personnel, and administrators served to prevent the design of an environment doomed to failure because of the lack of attention to special problems of the population of an institution.